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Giant magnetoresistance in perovskite like $\text{La}_{0.6}\text{Nd}_{0.2}\text{Ca}_{0.2}\text{MnO}_3$ thin films

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The polycrystalline $\text{La}_{0.6}\text{Nd}_{0.2}\text{Ca}_{0.2}\text{MnO}_3$ thin films have been deposited at 800°C on LaAlO_3 substrate using pulsed laser deposition. The magnetoresistance ($\text{MR} = \Delta R / R_{(H=0)}$) of thin film at $H=4\text{T}$ initially increases with decreasing temperature attaining a peak value of 80% close to the ferromagnetic transition temperature at 150K and then show slow increase in MR leading to saturation at lower temperatures below 75K up to 10K with a MR value of 95%. The bulk sample exhibits maximum MR value of 40% in the temperature range of 10K to 150K, which is 50% smaller than the thin film MR values. In the film, the insulator to metal transition and the saturation magnetization are considerably lower compared to bulk sample, inspite of both having the same Curie temperature. The thin film exhibits a markedly different temperature dependence in zero field cooled and field cooled magnetization at 50 Oe in comparison to the bulk sample possibly due to the presence of domain walls.